Course Syllabus

1. **Course Title**: Design Project on Wastewater Treatment
2. **Course Code**: PWWT415110
3. **Credit Units:** 1 credits (0/1/2) (0 units of theory/ 1 unit of practice/ 2 units of self-study)

   Duration: 10 weeks (0 hours of theory+1 hours of practice, and 2 hours of self-study per week)
4. **Course Instructors:**

   1 / Hoang Thi Tuyet Nhung

   2 / Tran Thi Kim Anh
5. **Course Requirements:**

   Prerequisite courses: None

   Previous courses: None

   Parallel courses: None
6. **Course Description:**

   After project work, students are equipped with the knowledge and skills in the selection of technological process, doing the computational analysis and design of the units in the domestic and industrial wastewater treatment systems. Moreover, students can draw the technical drawings for the wastewater treatment plant.
7. **Course goals**

Goals	Goal description	Programme Expected learning outcome (ELOs)
G1	Recommending wastewater treatment processes and technological units in accordance with national emission standards for specific wastewater in Vietnam.	ELO3, ELO6
G2	Skills such as collecting documents, planning, calculating and drawing technical drawings	ELO7
G3	Designing technical drawings for the process and wastewater treatment units; proposing the operation modes for this system.	ELO15, ELO16

8. Course Learning Outcomes (CLOs)

CLOs		CLO Description	Programme ELOs
G1	CLO1	Propose the technological process of wastewater treatment system in accordance with the objectives.	ELO3
	CLO2	Design wastewater treatment units in accordance with the proposed process.	
	CLO3	Compare the environmental indicators of the wastewater treatment system with the environmental standards, construction standards, in accordance with the demand of enterprise and society.	ELO6
G2	CLO4	Practise planning skill, accurate manual, meticulosity in the calculation and technical drawing works.	ELO7
G3	CLO5	Deploy technological wastewater treatment processes and detail the treatment units with technical drawings.	ELO15
	CLO6	Explain the operation modes of the treatment and management systems.	ELO16

9. Learning Resources

- References**:**

[1]. WEF & ASCE (1992) Design of Municipal Wastewater Treatment Plants, Vol.1, WEF

[2]. Raymond D. Letterman (1999) Water quality and Treatment, Americal water work associatation, McGraw-Hill, Inc.

[3]. Ronald L.Droste, Theory and Practice of Water and Wastewater Treatment, Jonh Wiley and Sons, 1997

[4] Lâm Minh Triết, **Xử lý nước thải đô thị và công nghiệp**, NXB ĐH Quốc Gia TPHCM.

[5] Trịnh Xuân Lai, **Xử lý nước thải công nghiệp**, NXB Xây dựng, 2009

[6] Tomonori Matsuo, **Advances in water and wastewater treatment technology**, Elsevier Science B.V., 2001.

[7] Udo Wiesmann, **Fundamentals of Biological Wastewater Treatment**, WILEY-VCH, 2007.

[8] Ruth E Weiner and Robin A. Matthews, **Environmental Engineering**, Elsevier Butterworth-Heinemann, 2003.

[9] Nicholas P. Cheremisinoff, **Biotechnology for waste and wastewater treatment**, Noyes Publications, 1996.

[10] Simon Judd và Bruce Jefferson, **Membranes for Industrial Wastewater Recovery and Re-use**, Elsevier Ltd, 2003.

10. Student assessment

- Grading scale: 10

- Assessment plan:

Type	Content	Timeline	Assessment method	CLOs	Rate (%)
Skills					**20**
Exercise #1	Planning and time management for doing project work.	All process	Attendance (roll call)	CLO4	10
Exercise #2	Calculating and design environmental problems	Week 10	questions	CLO2	10
Report					**30**
Exercise #1	Report full project work and all drawings of units.	Week 15	Report	CLO1 CLO2 CLO3	**30**
Oral presentation					**50**
Exercise #1	Present, protect the ideas and results of wastewater treatment design.		Oral test	CLO3 CLO5 CLO6	50

11. Course Content:

Week	Contents	CLOs
1	**Part 1: PROJECT IMPLEMENTATION GUIDELINES (0/3/6)**	
	A/ Content and pedagogical methods in class **Content** 1.1 Objectives and meaning of project work in the educational propram) 1.2 Guide to collect information, document, use the information in project work 1.3 Guide to solve the requirement of project work 1.4 Work out the performance of project work **Pedagogical methods**: + Discussion + Guide to do project 1. Assignment task: Two students are in one group as well as	CLO1

	one topic. This topic concerning the design of a specific wastewater treatment plant. 2. Requirement: Students find out the characteristic of the chosen wastewater, propose and design two suitable technological process for wastewater treatment plant.	
	B/ Self-study content + Students find out the characteristic of the chosen wastewater, propose and design two suitable technological process for wastewater treatment plant. + Analyze advantages and disadvantages of each option. Select the best option. + Refer to the project work, dissertations.	CLO1 CLO3 CLO4
2-6	**Part 2: CALCULATION OF UNITS IN WASTEWATER TREATMENT PLANT (0/15/30)**	
	A/ Content and pedagogical methods in class **Content** 2.1 Search all problems relate to project work 2.2 Describe the technological processes of the treatment 2.3 Computational analysis and design of wastewater treatment plant **Pedagogical methods:** + Discussion + Guide to do project 1. Guide to students how to make references, computational analysis wastewater treatment units 2. Revise the errors in the calculation, report 3. Troubleshooting	CLO2
	B/ Self-study content + Refer to the document, computational analysis work units + Refer to another project works, theses	CLO2 CLO3 CLO4
7-9	**Part 3: TECHNICAL DRAWINGS (0/9/18)**	
	A/ Content and pedagogical methods in class **Content** 3.1 Instructions on how to present a technical drawing 3.2 Instructions on how to present a technological process drawing 3.3 Instructions on how to present a detailed technical drawing of wastewater treatment reactors **Pedagogical methods:** + Questions and responses + Discussion	CLO5 CLO6

	B/ Self-study content + Completing the drawing, the report + Refer to another project works, theses + Prepare to project work's protection	CLO3 CLO4 CLO5 CLO6
10	**Part 4: PROJECT PROTECTION (0/3/6)**	
	A/ Content and pedagogical methods in class **Content** 4.1 Student presents the knowledge of wastewater treatment technologies made 4.2 Questions and responses **Pedagogical methods:** + Questions and responses + Discussion	CLO1 CLO2 CLO3 CLO5 CLO6
	B/ Self-study content + Review the knowledge which the students have not mastered	CLO4

12. Learning Ethics:

+ The copy of All the exercises and translated information from internet are banned. If this thing are detected, the process score of students will be zero; and in serious case, these students who joined this problem, will be banned from taking their final exam.
+ In case of the detection of students who replace the others in the exam, all of them will be suspended or leaved the learning program.

13. Date of first approval: August 1st, 2012

14. Approval by:

Dean of the faculty	Head of department	Complier
A/Prof. Nguyen Van Suc	**MSc Nguyen Thi Minh Nguyet**	**Hoang Thi Tuyet Nhung**

15. Date and Up-to-date content

1st time: - Update content and structure of the programme adjusted in 2015	Instructor: **Hoang Thi Tuyet Nhung** Head of Department: **Dr Tran Thi Kim Anh**